

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
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Katsumi SHIBAYAMA et al.)	Confirmation No.: 2756
)	
Application No.: 10/715,118)	Group Art Unit: 2814
)	
Filed: November 18, 2003)	Examiner: Shrinivas H. Rao
)	
For: BACK ILLUMINATED)	
PHOTODIODE ARRAY,)	
MANUFACTURING METHOD AND))	
SEMICONDUCTOR DEVICE)	
THEREOF)	

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Window, Mail Stop AF
Alexandria, VA 22314

Sir:

REQUEST FOR PRE-APPEAL BRIEF CONFERENCE

Applicants respectfully request a pre-appeal brief conference for the reasons set forth below. Applicants respectfully submit that clear errors exist in the 35 U.S.C. § 102(b) rejection of claims 1, 3-15 and 26-28 based on Bauer et al. (U.S. Patent Publication No. 2002/0011640)("Bauer"). Applicants also respectfully submit that clear errors exist in the 35 U.S.C. § 103(a) rejection of claim 16 based on Bauer in view of Yamanaka et al. (U.S. Patent Number 6,372,558)("Yamanaka").

The 35 U.S.C. § 102(a) Rejection of Claims 1, 3-15 and 26-28

The Office has not alleged that Bauer discloses the following portion of claim 1: "wherein each of said recessed portions of said first conductive type semiconductor substrate is surrounded by portions of said first conductive type semiconductor substrate that form a frame part, located between a plurality of said recessed portions, which is thicker than and frames the respective recessed portion." For at least this reason the rejection is clearly erroneous and should be withdrawn.

Additionally, the Office asserts at *p. 2, ll. 1-3* of the Office Action that element 2 of Bauer teaches a “first conductive type semiconductor substrate,” but element 2 is described as a transparent substrate—not a semiconductor substrate. Bauer, *para. 0012*. If there is a “first conductive type semiconductor substrate” in Bauer it would have to be either element 3 or element 4.

Moreover, Bauer does not disclose or suggest the following portion of claim 1:
wherein said first conductive type semiconductor substrate is thinner in
said recessed portions of said first conductive type substrate than in
portions of said first conductive type semiconductor substrate **located
around said recessed portions**

The Office appears to be equating one or more of elements 2, 3, or 4 of FIG. 2 of Bauer to the “first conductive type substrate” of claim 1. But, none of elements 2, 3, or 4 of FIG. 2 can be “located around said recessed portions” for the following reasons. Bauer describes element 5.1 as being “substantially concentrically arranged around a central area.” Bauer, *p. 1, para. 0013, ll. 9-12*. And, “layer 4 ... [is] arranged on the central surface of the first semiconductor layer 3, which is not covered by the first zone of second conductivity 5.1.” *Id. at para. 0014, ll. 1-5*. So, layer 4 is a round projection since it must be as it is built up on top of the portion of layer 3 that is not layer 5.1 and is surrounded by layer 5.1 that is “substantially concentrically around a central area.” *Id.* The round projections are elements 9.1 and 9.2 which are described in paragraph 0016 of Bauer as “a single cell of the array comprises a central elevation.” The structure of elements 9.1 and 9.2 becomes apparent in FIG. 1 of Bauer where elements 9.1 and 9.2 (which contain elements 4 and 6) are illustrated as small round projections. A small round projection cannot be “located around said recessed portions.” A round projection simply cannot be “around” anything but itself.

In contrast to Bauer, an examination of FIG. 1 of the present application, illustrates that the “first conductive type semiconductor substrate [is] located around said recessed portions” as the recessed portions (element 4) are surrounded by the substrate element 3 of FIG. 2. This can be seen in FIGS. 1 and 2 of the present application since element 3 is built up around the recessed portions (element 4). Note that by the description in Bauer that element 5 in FIG. 2 of Bauer would come out of the page and

surround elements 9.1 and 9.2 turning elements 9.1 and 9.2 into little round projections, which as discussed above cannot be “located around recessed portions.” In contrast, in the present application in FIG. 2, element 4a would not come out of the page and surround element 13.

Moreover, Bauer does not disclose or suggest the following portion of claim 1:

each of said **recessed portions** of said first conductive type semiconductor substrate is **surrounded** by portions of said first conductive type semiconductor substrate that form a **frame part**, located between a plurality of said recessed portions, which is thicker than and **frames** the respective recessed portion

As discussed above, the projections (elements 9.1 and 9.2) in Bauer are not a “frame part” surrounding the recess, because the projections 9.1 and 9.2 cannot surround anything. Moreover, the first zone (element 5.1 of Bauer) is not formed at a bottom of a recess because in the Bauer arrangement, element 5.1 comes out of FIG. 2 of Bauer and surrounds elements 9.1 and 9.2. (The size and shape of elements 9.1 and 9.2 is illustrated in FIG. 1 of Bauer.) So, there are no recesses in Bauer and, even if there were, elements 9.1 and 9.2 do not surround or frame recesses.

Accordingly, for at least the above reasons, the rejection of claim 1 is clearly erroneous and should be withdrawn. Moreover, since claims 2-16, 27, and 28 depend from claim 1, withdrawal of the rejections of claims 2-16, 27, and 28 is requested for at least the same reasons as for claim 1.

The 35 U.S.C. § 103(a) Rejection of Dependent Claim 16

The Office admits that Bauer fails to teach the crystal plane orientation recited in claim 16. The Office contends that Yamanaka teaches this feature. However, Applicants respectfully submit that Yamanaka fails to make up for the deficiencies in the teachings of Bauer as discussed above to have rendered even independent claim 1 unpatentable. Accordingly, Applicants respectfully request withdrawal of the rejection of claim 16.

The 35 U.S.C. § 102(a) Rejection of Claim 26

The Office alleges that Bauer discloses “a back-illuminated photodiode array comprising a semiconductor substrate, wherein only one side of said semiconductor

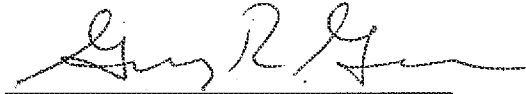
substrate has a plurality of recesses, and wherein **each shape of openings of said recesses is square**" as recited in claim 26. As discussed above, in Bauer there are round projections (elements 9.1 and 9.2), and not recesses. Additionally, note that the Office Action is apparently equating the general shape in FIG. 2 of Bauer with a square, but FIG. 2 is a cross section that is not in proportion (as evidenced by the labeling of FIG. 9.1 and 9.2 as small round projections in FIG. 1 of Bauer.) Moreover, as discussed above element 5.1 comes out of FIG. 2 of Bauer and surrounds elements 9.1 and 9.2. The "shape of openings" in Bauer, if there are openings, is certainly not square.

Withdrawn Claims 17-25

Applicants acknowledge the Examiner statement on page 2 of the Office Action regarding withdrawn claims 17-25. However, Applicants respectfully submit that claim 17 depends from claim 7, which depends from claim 1, claim 20 depends from claim 4, which depends from claim 1, and claim 25 depends from claim 15, which depends from claim 1. Also, claims 18 and 19 depend from claim 17, and claims 21-24 depend either directly or indirectly from claim 20. Accordingly, Applicants submit that should claim 1 be found to be allowable, claims 17-25 should be allowable by their dependency. Hence, Applicants respectfully request that these claims be maintained in the present application

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Gregory R. Grace', written over a horizontal line.

Gregory R. Grace, Reg. No. 59,733

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